

Claims

What is claimed is:

5 1. A tunable antenna matching circuit comprising:  
a ferro-electric tunable component configured  
to be coupled to an antenna;  
a matching circuit comprising the ferro-  
electric tunable component;  
10 a control line operably coupled to the ferro-  
electric component;  
a control source electrically coupled to the  
control line, the control source configured to  
transmit a control signal on the control line;  
15 wherein the ferro-electric component,  
responsive to the control signal, adjusts the  
impedance of the matching circuit.

2. The tunable antenna matching circuit of claim 1,  
wherein the ferro-electric tunable component  
20 comprises a ferro-electric tunable capacitor.

3. The tunable antenna matching circuit of claim 2,  
further comprising a substrate wherein the

capacitor is directly mechanically coupled to the substrate.

4. The tunable antenna matching circuit of claim 1, further comprising:

5 a first inductor coupled, at a first end of the first inductor, to ground and configured to be coupled to an antenna at a second end of the first inductor;

10 a second inductor coupled, at a first end of the second inductor, to the second end of the first inductor;

15 a first capacitor coupled, at a first end of the first capacitor, to a second end of the second inductor and to ground at a second end of the first capacitor;

a second capacitor coupled to the second end of the second inductor.

5. A wireless communication device comprising:

20 a battery;  
a transceiver;  
a user interface;

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1 a housing encasing the battery and the  
2 transceiver and adapted to present the user  
3 interface external to the housing;

4 an antenna matching circuit, configured to be  
5 coupled to an antenna and comprising a ferro-  
6 electric tunable component;

7 a control signal generator for generating a  
8 control signal;

9 a control line coupled to the control signal  
10 generator and to the ferro-electric component;

11 a control source electrically coupled to the  
12 control line, the control source configured to  
13 transmit a control signal on the control line;

14 wherein the ferro-electric component,  
15 responsive to the control signal, adjusts the  
16 impedance of the matching circuit.

17 6. The wireless communication device of claim 5,  
18 wherein the ferro-electric tunable component  
19 comprises a ferro-electric tunable capacitor.

20 7. The wireless communication device of claim 6,  
21 further comprising a substrate wherein the  
22 capacitor is directly mechanically coupled to the  
23 substrate.

8. The wireless communication device of claim 5,  
further comprising:

5 a first inductor coupled, at a first end of  
the first inductor, to ground and configured to be  
coupled to an antenna at a second end of the first  
inductor;

a second inductor coupled, at a first end of  
the second inductor, to the second end of the  
first inductor;

10 a first capacitor coupled, at a first end of  
the first capacitor, to a second end of the second  
inductor and to ground at a second end of the  
first capacitor;

15 a second capacitor coupled to the second end  
of the second inductor.